FIG. 1

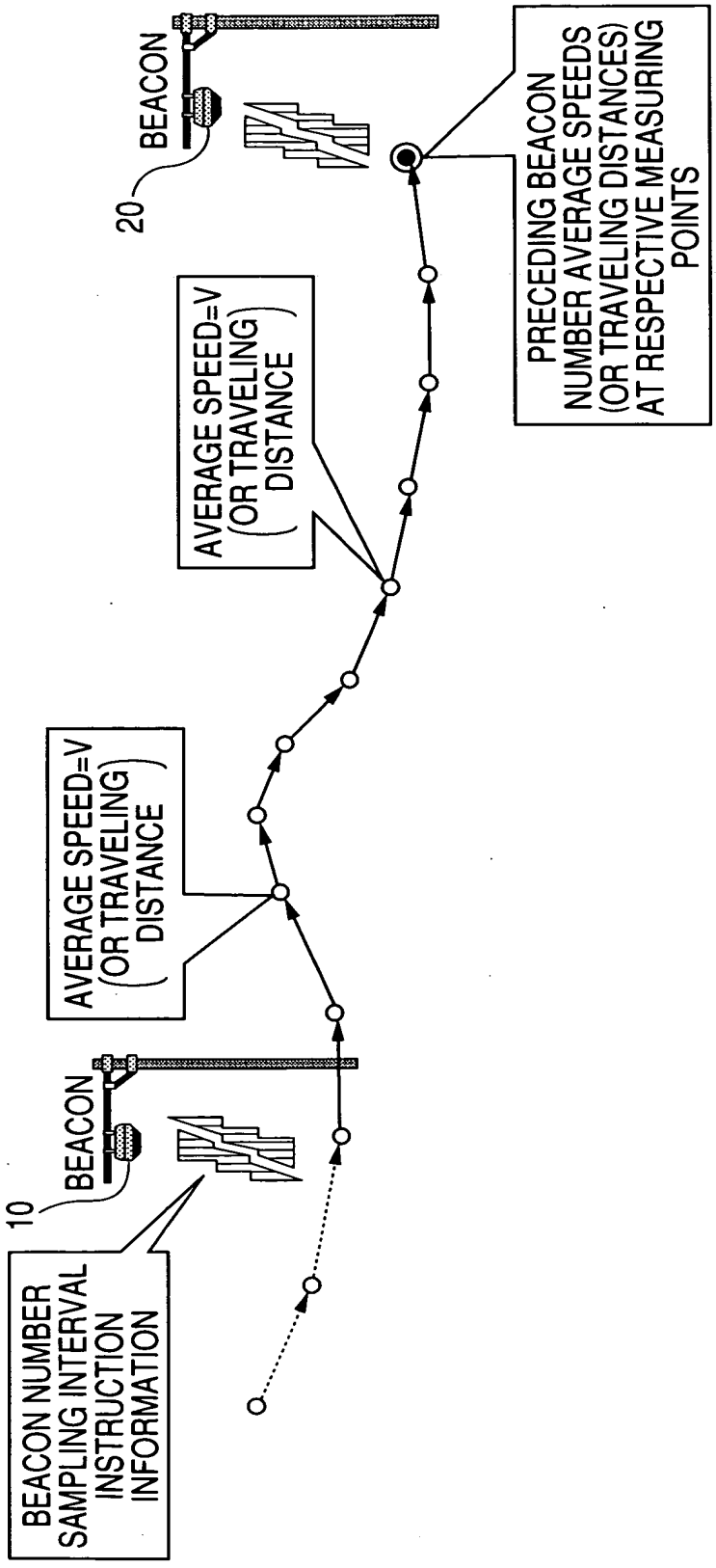


FIG. 2A

BEACON→FCD
TRANSMISSION DATA
FORMAT EXAMPLE
(UPSTREAM SIDE)

BEACON NUMBER
SAMPLING DISTANCE INTERVAL OF SPEED (=150m)

FIG. 2B

FCD→CENTER
EQUIPMENT TRANSMISSION
DATA FORMAT EXAMPLE
(DOWNSTREAM SIDE)

NUMBER OF THE LAST-PASSED BEACON
TRAVELING DISTANCE FROM THE LAST-PASSED BEACON
SAMPLING DISTANCE INTERVAL OF SPEED (150m)
OFFSET DISTANCE BETWEEN THE FINAL MEASURING POINT AND THE BEACON UP POINT
NUMBER (N) OF SAMPLING POINTS OF SPEED INFORMATION
MEASURING POINTS 1 TO 2 AVERAGE SPEED
MEASURING POINTS 2 TO 3 AVERAGE SPEED
⟆
MEASURING POINTS N-1 TO N AVERAGE SPEED

FIG. 3

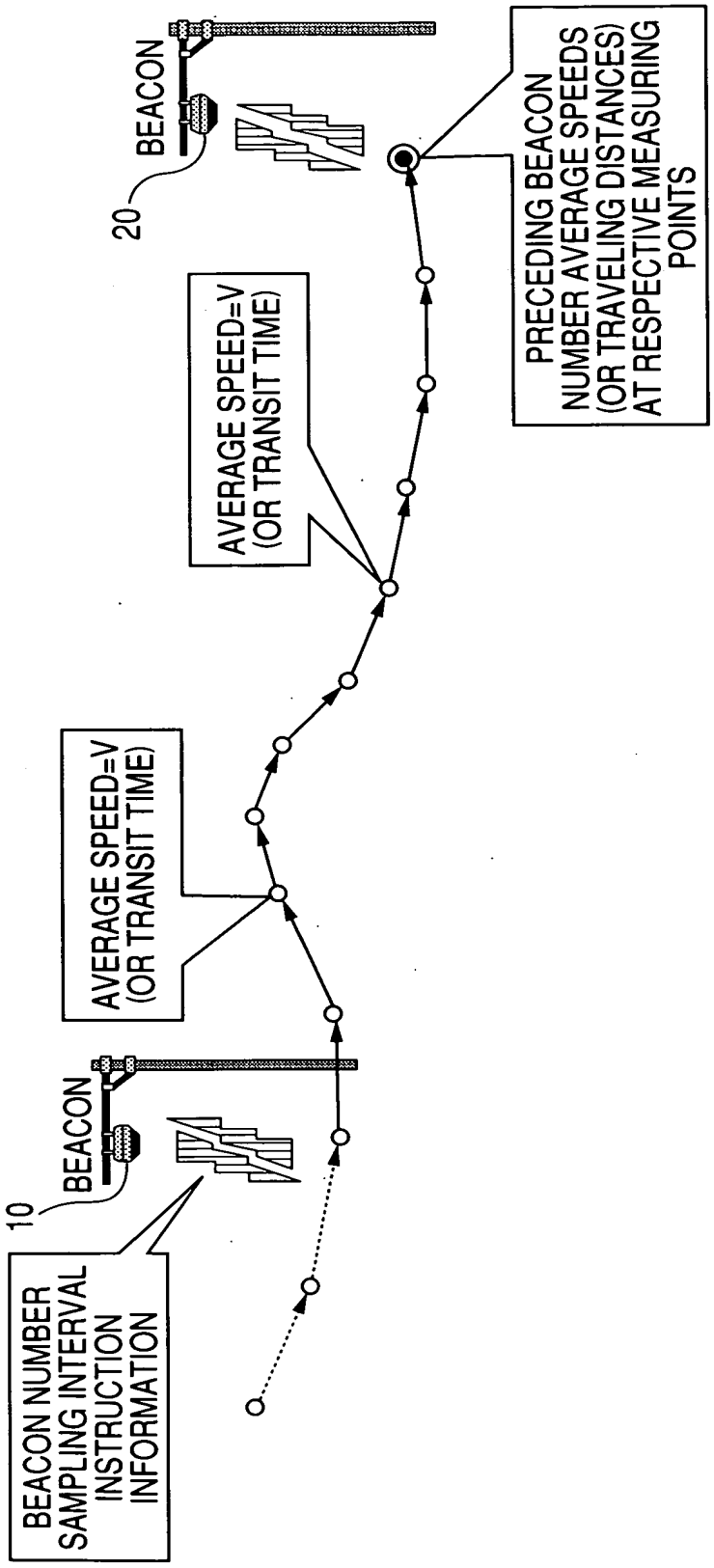

BEACON
20
PRECEDING BEACON NUMBER AVERAGE SPEEDS (OR TRAVELING DISTANCES) AT RESPECTIVE MEASURING POINTS
AVERAGE SPEED=V (OR TRANSIT TIME)
AVERAGE SPEED=V (OR TRANSIT TIME)
BEACON
10
BEACON NUMBER SAMPLING INTERVAL INSTRUCTION INFORMATION

FIG. 4A

BEACON→FCD
TRANSMISSION DATA
FORMAT EXAMPLE
(UPSTREAM SIDE)

BEACON NUMBER
INSTRUCTION NUMBER OF THE CODING SYSTEM
SAMPLING DISTANCE INTERVAL OF SPEED (=150m)
QUANTIZATION UNIT OF SPEED INFORMATION
CODE TABLE OF A SPEED DIFFERENCE ΔV

FIG. 4B

FCD→CENTER
EQUIPMENT TRANSMISSION
DATA FORMAT EXAMPLE
(DOWNSTREAM SIDE)

NUMBER OF THE BEACON PASSED PRECEDINGLY
TRAVELING DISTANCE FROM THE BEACON PASSED PRECEDINGLY
IDENTIFICATION NUMBER OF THE APPLIED CODING SYSTEM
SAMPLING DISTANCE INTERVAL OF SPEED (150m)
OFFSET DISTANCE BETWEEN THE FINAL MEASURING POINT AND THE BEACON UP POINT
NUMBER (N) OF SAMPLING POINTS OF SPEED INFORMATION
ABSOLUTE SPEED AT THE FINAL MEASURING POINT
CODING DATA OF A SPEED DIFFERENCE COMPONENT FROM THE PRECEDING NODE (ΔVi, BIT SEQUENCE OBTAINED BY THE RUN LENGTH CODING)

FIG. 5

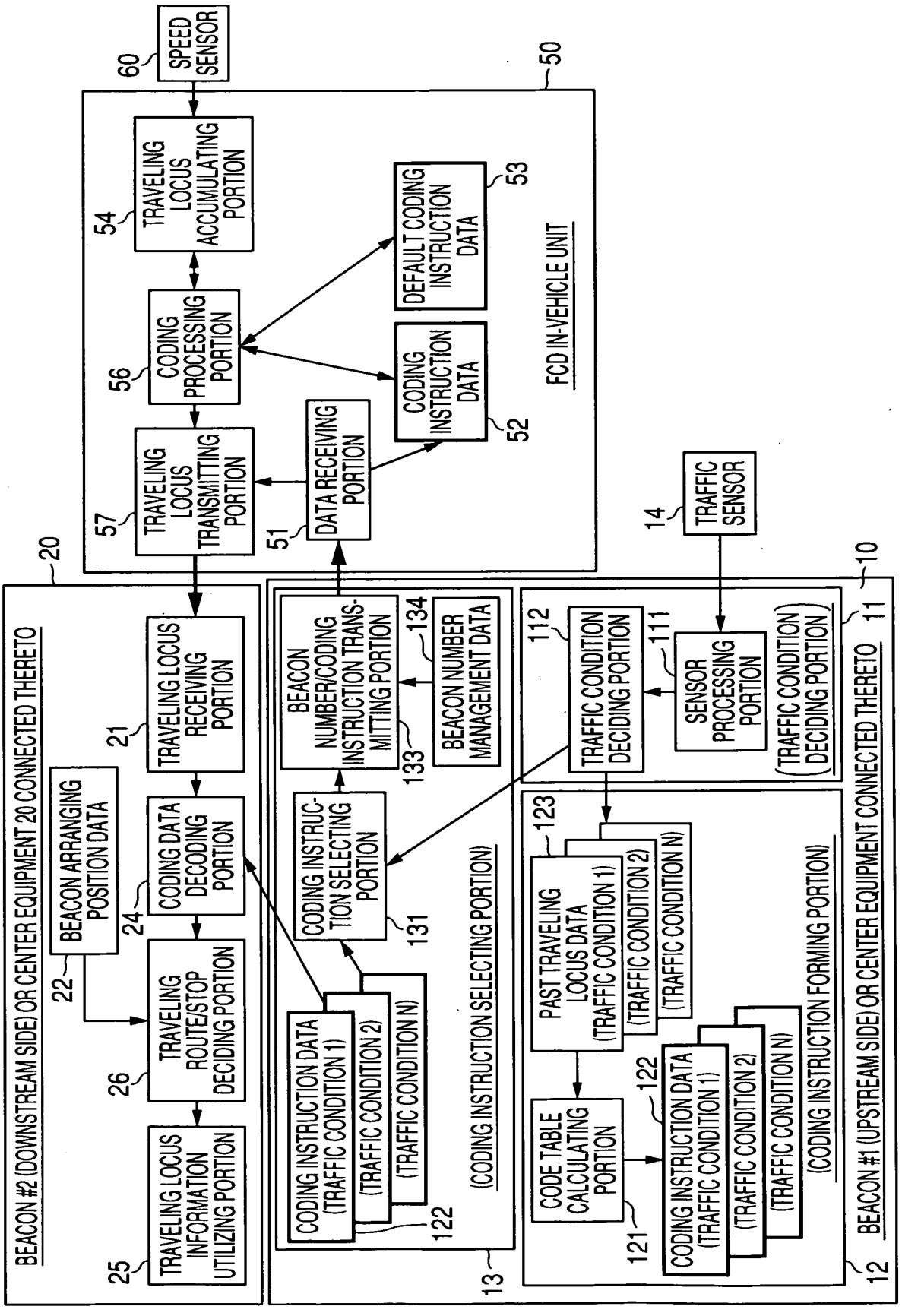

CONFIGURATIVE EXAMPLE OF THE SYSTEM
BEACON #2 (DOWNSTREAM SIDE) OR CENTER EQUIPMENT 20 CONNECTED THERETO
20
BEACON ARRANGING POSITION DATA
22
TRAVELING ROUTE/STOP DECIDING PORTION
26
TRAVELING LOCUS INFORMATION UTILIZING PORTION
25
TRAVELING LOCUS RECEIVING PORTION
21
CODING DATA DECODING PORTION
24
FCD IN-VEHICLE UNIT
50
SPEED SENSOR
60
TRAVELING LOCUS ACCUMULATING PORTION
54
CODING PROCESSING PORTION
56
TRAVELING LOCUS TRANSMITTING PORTION
57
DATA RECEIVING PORTION
51
DEFAULT CODING INSTRUCTION DATA
53
CODING INSTRUCTION DATA
52
TRAFFIC SENSOR
14
BEACON #1 (UPSTREAM SIDE) OR CENTER EQUIPMENT CONNECTED THERETO
10
(TRAFFIC CONDITION) DECIDING PORTION
11
TRAFFIC CONDITION DECIDING PORTION
112
SENSOR PROCESSING PORTION
111
BEACON NUMBER/CODING INSTRUCTION TRANSMITTING PORTION
134
133
BEACON NUMBER MANAGEMENT DATA
CODING INSTRUCTION SELECTING PORTION
131
CODING INSTRUCTION DATA (TRAFFIC CONDITION 1)
(TRAFFIC CONDITION 2)
(TRAFFIC CONDITION N)
122
(CODING INSTRUCTION SELECTING PORTION)
13
PAST TRAVELING LOCUS DATA (TRAFFIC CONDITION 1)
(TRAFFIC CONDITION 2)
(TRAFFIC CONDITION N)
123
CODE TABLE CALCULATING PORTION
121
CODING INSTRUCTION DATA (TRAFFIC CONDITION 1)
(TRAFFIC CONDITION 2)
(TRAFFIC CONDITION N)
122
(CODING INSTRUCTION FORMING PORTION)
12

FIG. 6

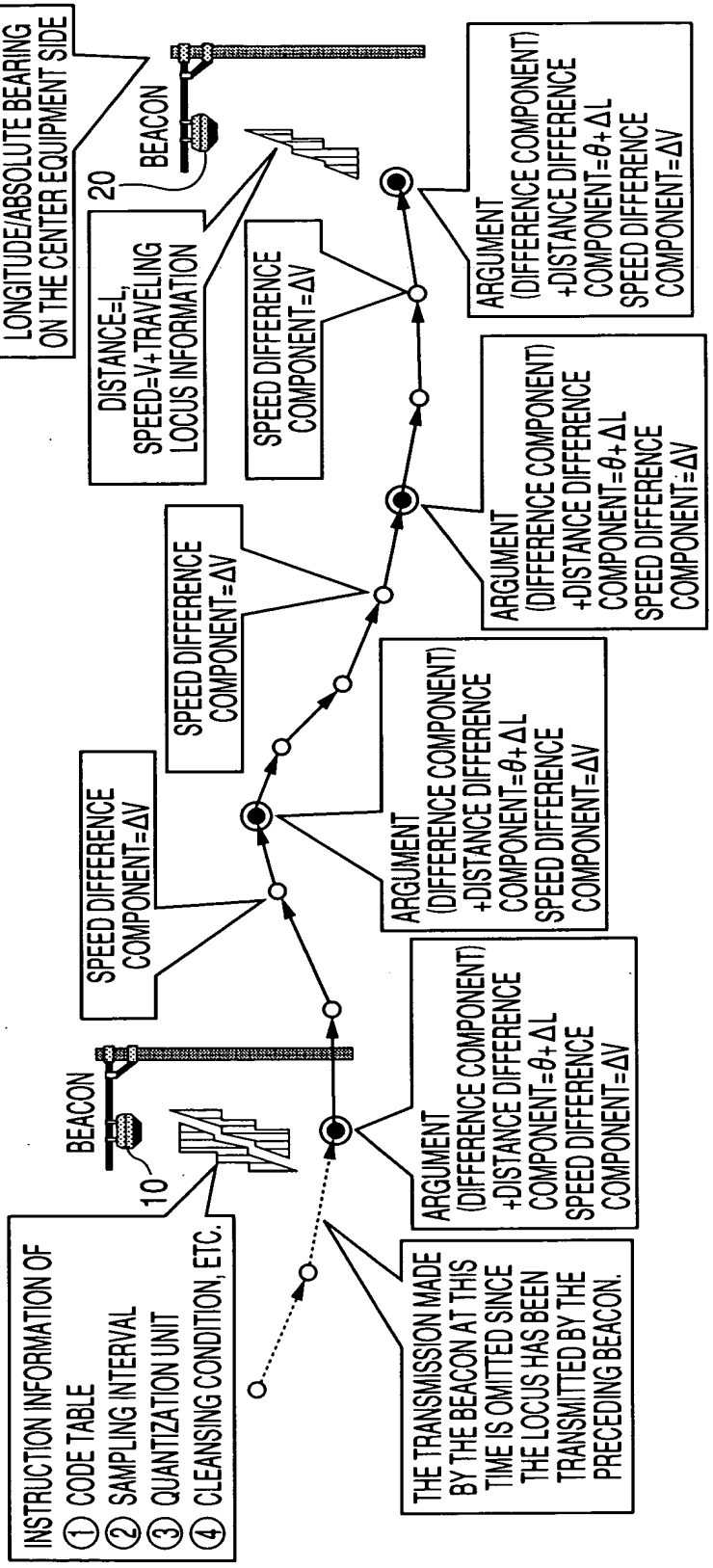

INSTRUCTION INFORMATION OF
① CODE TABLE
② SAMPLING INTERVAL
③ QUANTIZATION UNIT
④ CLEANSING CONDITION, ETC.
BEACON
10
THE TRANSMISSION MADE BY THE BEACON AT THIS TIME IS OMITTED SINCE THE LOCUS HAS BEEN TRANSMITTED BY THE PRECEDING BEACON.
SPEED DIFFERENCE COMPONENT=ΔV
ARGUMENT (DIFFERENCE COMPONENT) +DISTANCE DIFFERENCE COMPONENT=θ+ΔL SPEED DIFFERENCE COMPONENT=ΔV
SPEED DIFFERENCE COMPONENT=ΔV
ARGUMENT (DIFFERENCE COMPONENT) +DISTANCE DIFFERENCE COMPONENT=θ+ΔL SPEED DIFFERENCE COMPONENT=ΔV
DISTANCE=L, SPEED=V+TRAVELING LOCUS INFORMATION
SPEED DIFFERENCE COMPONENT=ΔV
ARGUMENT (DIFFERENCE COMPONENT) +DISTANCE DIFFERENCE COMPONENT=θ+ΔL SPEED DIFFERENCE COMPONENT=ΔV
ADD THE ABSOLUTE LATITUDE LONGITUDE/ABSOLUTE BEARING ON THE CENTER EQUIPMENT SIDE
20
BEACON

FIG. 7

BEACON→FCD TRANSMISSION DATA FORMAT EXAMPLE
CODING SYSTEM INSTRUCTION NUMBER
IDENTIFICATION FLAG INDICATING EITHER ARGUMENT REPRESENTATION OR ARGUMENT PREDICTION DIFFERENCE COMPONENT REPRESENTATION (=ARGUMENT REPRESENTATION)
IDENTIFICATION FLAG INDICATING EITHER EQUAL-TIME SAMPLING OR EQUIDISTANCE SAMPLING, AND MEASURED INFORMATION INSTRUCTION (=EQUIDISTANCE SAMPLING, MEASURED INFORMATION ARE θ, V)
SAMPLING DISTANCE INTERVAL OF POSITION INFORMATION (=200m)
SAMPLING DISTANCE INTERVAL OF SPEED INFORMATION (=25m)
QUANTIZATION UNIT OF THE ARGUMENT (=3°)
QUANTIZATION UNIT OF THE SPEED INFORMATION
CODE TABLE OF THE ARGUMENT θ
CODE TABLE OF THE SPEED DIFFERENCE ΔV

FIG. 8

QUANTATION UNIT OF SPEED INFORMATION

QUANTIZATION UNIT	SPEED (km/h)
0	0
1	1
2	2
3	3
4	4
5	5 TO 6
6	7 TO 8
7	9 TO 10
8	11 TO 13
9	14 TO 16
10	17 TO 19
11	20 TO 24
12	25 TO 29
13	30 TO 34
14	35 TO 39
15	40 TO 44
16	45 TO 49
17	50 TO 59
18	60 TO 69
⟆	

FIG. 9A

CODE TABLE OF θ

VALUE OF θ (DIFFERENCE IN QUANTIZATION UNIT)	CODE	ADDITIONAL BIT
0	0	0
RUN LENGTH 8 OF 0	11110	0
±1	100	1 (±IDENTIFICATION)
±2	101	1 (±IDENTIFICATION)
±3	1100	1 (±IDENTIFICATION)
	. . .	

FIG. 9B

CODE TABLE OF ΔV

VALUE OF θ (DIFFERENCE IN QUANTIZATION UNIT)	CODE	ADDITIONAL BIT
0	0	0
RUN LENGTH 8 OF 0	11110	0
±1	100	1 (±IDENTIFICATION)
±2	101	1 (±IDENTIFICATION)
±3	1100	1 (±IDENTIFICATION)
	. . .	

FIG. 10

FCD→CENTER
EQUIPMENT TRANSMISSION DATA FORMAT EXAMPLE

VEHICLE ID INFORMATION
CODING SYSTEM INSTRUCTION NUMBER
NUMBER OF θ MEASURING POINTS
CODED DATA OF THE ARGUMENT θ TO THE PRECEDING MEASURING POINT (BIT SEQUENCE OF CODED θ)
SPEED V AT THE FINAL MEASURING POSITION
NUMBER OF ΔV MEASURING POINTS
CODED DATA OF THE SPEED DIFFERENCE COMPONENT FROM THE PRECEDING NODE (BIT SEQUENCE OF CODED ΔV)

FIG. 11

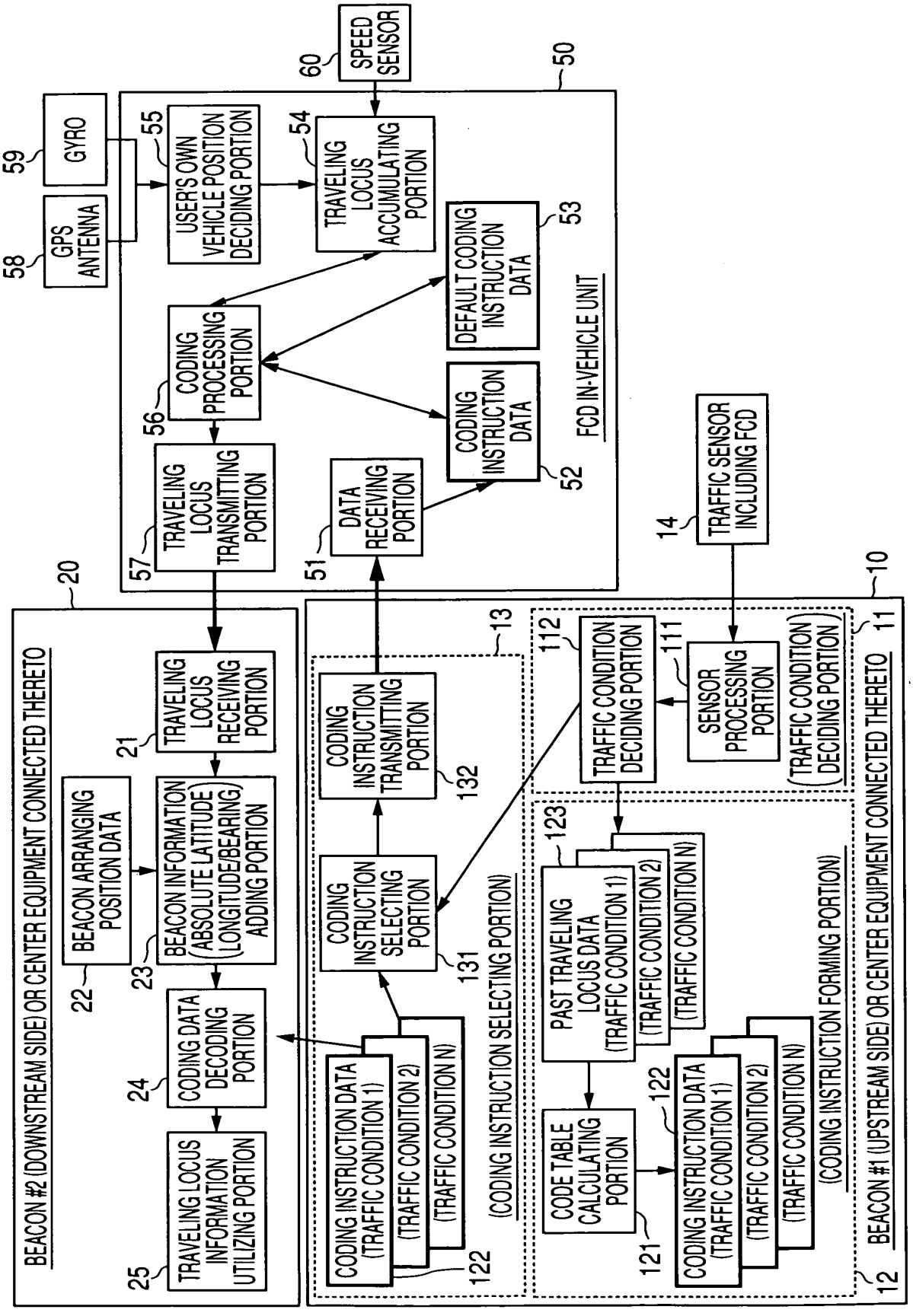

CONFIGURATIVE EXAMPLE OF THE SYSTEM
BEACON #2 (DOWNSTREAM SIDE) OR CENTER EQUIPMENT CONNECTED THERETO
BEACON #1 (UPSTREAM SIDE) OR CENTER EQUIPMENT CONNECTED THERETO
FCD IN-VEHICLE UNIT
SPEED SENSOR
GYRO
GPS ANTENNA
USER'S OWN VEHICLE POSITION DECIDING PORTION
TRAVELING LOCUS ACCUMULATING PORTION
DEFAULT CODING INSTRUCTION DATA
CODING PROCESSING PORTION
CODING INSTRUCTION DATA
TRAVELING LOCUS TRANSMITTING PORTION
DATA RECEIVING PORTION
TRAFFIC SENSOR INCLUDING FCD
TRAVELING LOCUS RECEIVING PORTION
BEACON ARRANGING POSITION DATA
BEACON INFORMATION (ABSOLUTE LATITUDE/LONGITUDE/BEARING) ADDING PORTION
CODING DATA DECODING PORTION
TRAVELING LOCUS INFORMATION UTILIZING PORTION
CODING INSTRUCTION TRANSMITTING PORTION
CODING INSTRUCTION SELECTING PORTION
CODING INSTRUCTION DATA (TRAFFIC CONDITION 1)
(TRAFFIC CONDITION 2)
(TRAFFIC CONDITION N)
TRAFFIC CONDITION DECIDING PORTION
SENSOR PROCESSING PORTION
(TRAFFIC CONDITION) DECIDING PORTION
PAST TRAVELING LOCUS DATA (TRAFFIC CONDITION 1)
(TRAFFIC CONDITION 2)
(TRAFFIC CONDITION N)
CODE TABLE CALCULATING PORTION
CODING INSTRUCTION DATA (TRAFFIC CONDITION 1)
(TRAFFIC CONDITION 2)
(TRAFFIC CONDITION N)
(CODING INSTRUCTION FORMING PORTION)
(CODING INSTRUCTION SELECTING PORTION)
10
11
12
13
20
21
22
23
24
25
50
51
52
53
54
55
56
57
58
59
60
111
112
121
122
123
131
132
14

FIG. 12

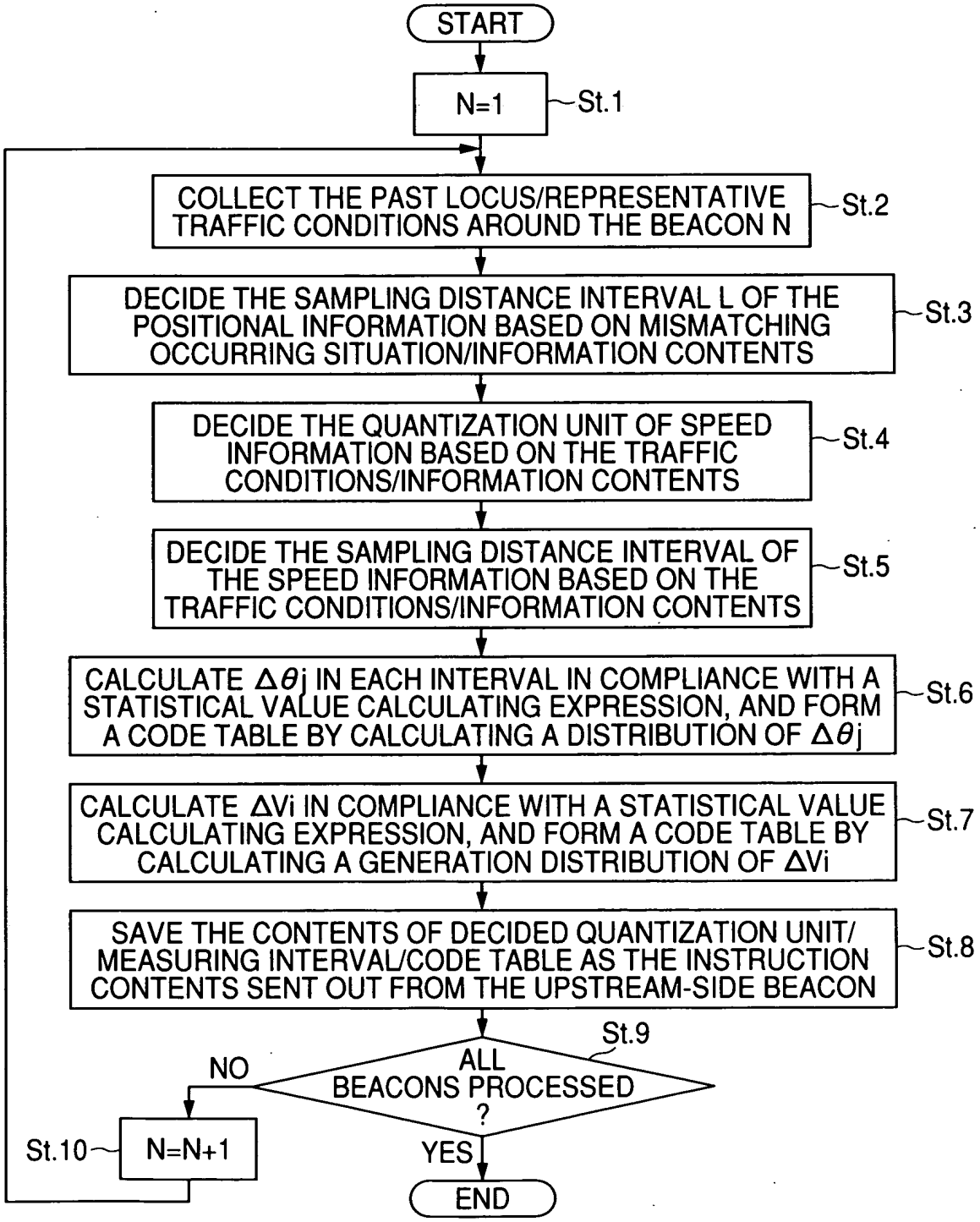

START
N=1
St.1
COLLECT THE PAST LOCUS/REPRESENTATIVE TRAFFIC CONDITIONS AROUND THE BEACON N
St.2
DECIDE THE SAMPLING DISTANCE INTERVAL L OF THE POSITIONAL INFORMATION BASED ON MISMATCHING OCCURRING SITUATION/INFORMATION CONTENTS
St.3
DECIDE THE QUANTIZATION UNIT OF SPEED INFORMATION BASED ON THE TRAFFIC CONDITIONS/INFORMATION CONTENTS
St.4
DECIDE THE SAMPLING DISTANCE INTERVAL OF THE SPEED INFORMATION BASED ON THE TRAFFIC CONDITIONS/INFORMATION CONTENTS
St.5
CALCULATE Δθj IN EACH INTERVAL IN COMPLIANCE WITH A STATISTICAL VALUE CALCULATING EXPRESSION, AND FORM A CODE TABLE BY CALCULATING A DISTRIBUTION OF Δθj
St.6
CALCULATE ΔVi IN COMPLIANCE WITH A STATISTICAL VALUE CALCULATING EXPRESSION, AND FORM A CODE TABLE BY CALCULATING A GENERATION DISTRIBUTION OF ΔVi
St.7
SAVE THE CONTENTS OF DECIDED QUANTIZATION UNIT/ MEASURING INTERVAL/CODE TABLE AS THE INSTRUCTION CONTENTS SENT OUT FROM THE UPSTREAM-SIDE BEACON
St.8
St.9
ALL BEACONS PROCESSED ?
NO
YES
St.10
N=N+1
END

FIG. 13

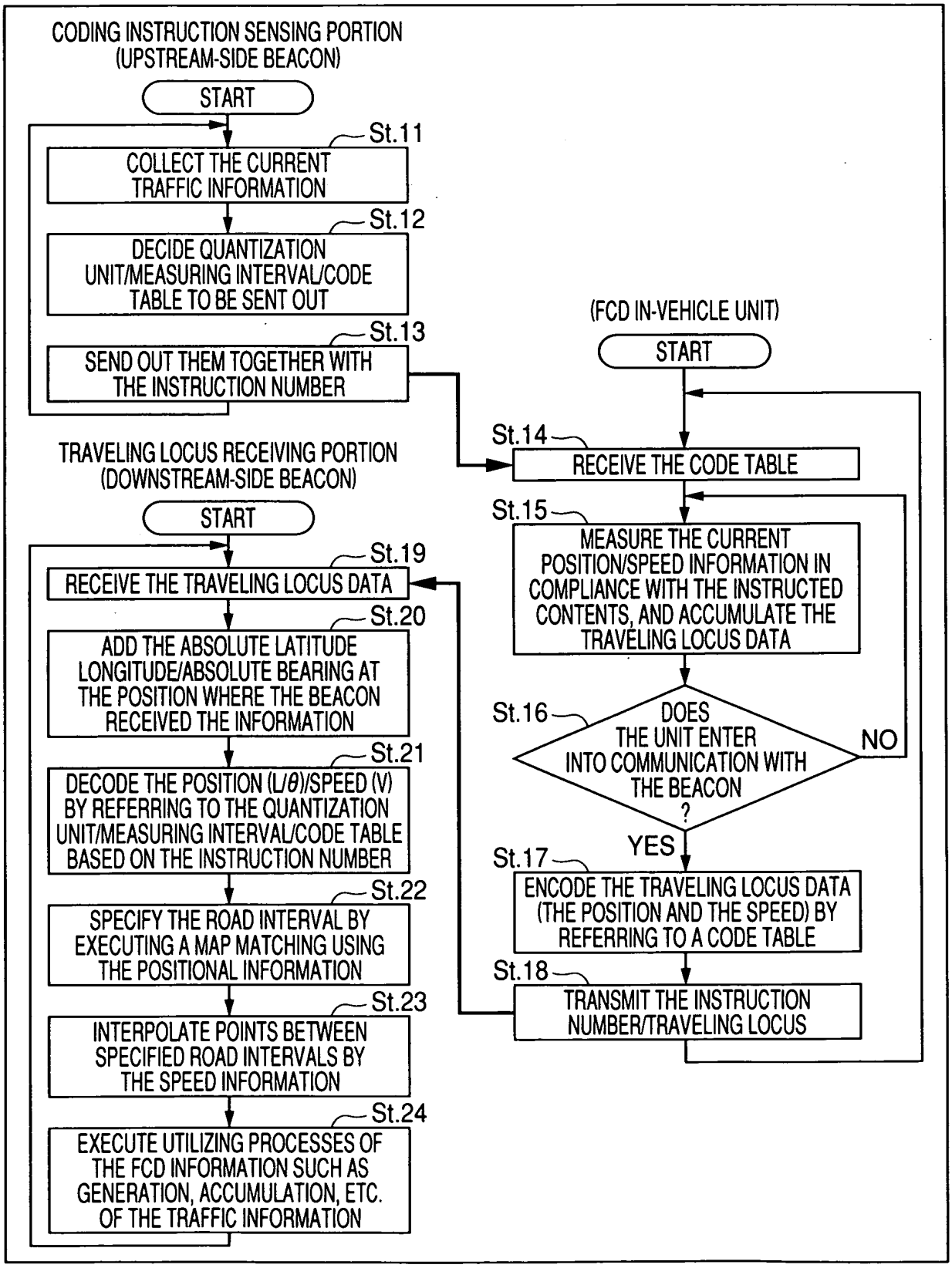

CODING INSTRUCTION SENSING PORTION
(UPSTREAM-SIDE BEACON)
START
St.11
COLLECT THE CURRENT TRAFFIC INFORMATION
St.12
DECIDE QUANTIZATION UNIT/MEASURING INTERVAL/CODE TABLE TO BE SENT OUT
St.13
SEND OUT THEM TOGETHER WITH THE INSTRUCTION NUMBER
TRAVELING LOCUS RECEIVING PORTION
(DOWNSTREAM-SIDE BEACON)
START
St.19
RECEIVE THE TRAVELING LOCUS DATA
St.20
ADD THE ABSOLUTE LATITUDE LONGITUDE/ABSOLUTE BEARING AT THE POSITION WHERE THE BEACON RECEIVED THE INFORMATION
St.21
DECODE THE POSITION (L/θ)/SPEED (V) BY REFERRING TO THE QUANTIZATION UNIT/MEASURING INTERVAL/CODE TABLE BASED ON THE INSTRUCTION NUMBER
St.22
SPECIFY THE ROAD INTERVAL BY EXECUTING A MAP MATCHING USING THE POSITIONAL INFORMATION
St.23
INTERPOLATE POINTS BETWEEN SPECIFIED ROAD INTERVALS BY THE SPEED INFORMATION
St.24
EXECUTE UTILIZING PROCESSES OF THE FCD INFORMATION SUCH AS GENERATION, ACCUMULATION, ETC. OF THE TRAFFIC INFORMATION
(FCD IN-VEHICLE UNIT)
START
St.14
RECEIVE THE CODE TABLE
St.15
MEASURE THE CURRENT POSITION/SPEED INFORMATION IN COMPLIANCE WITH THE INSTRUCTED CONTENTS, AND ACCUMULATE THE TRAVELING LOCUS DATA
St.16
DOES THE UNIT ENTER INTO COMMUNICATION WITH THE BEACON ?
NO
YES
St.17
ENCODE THE TRAVELING LOCUS DATA (THE POSITION AND THE SPEED) BY REFERRING TO A CODE TABLE
St.18
TRANSMIT THE INSTRUCTION NUMBER/TRAVELING LOCUS

FIG. 14

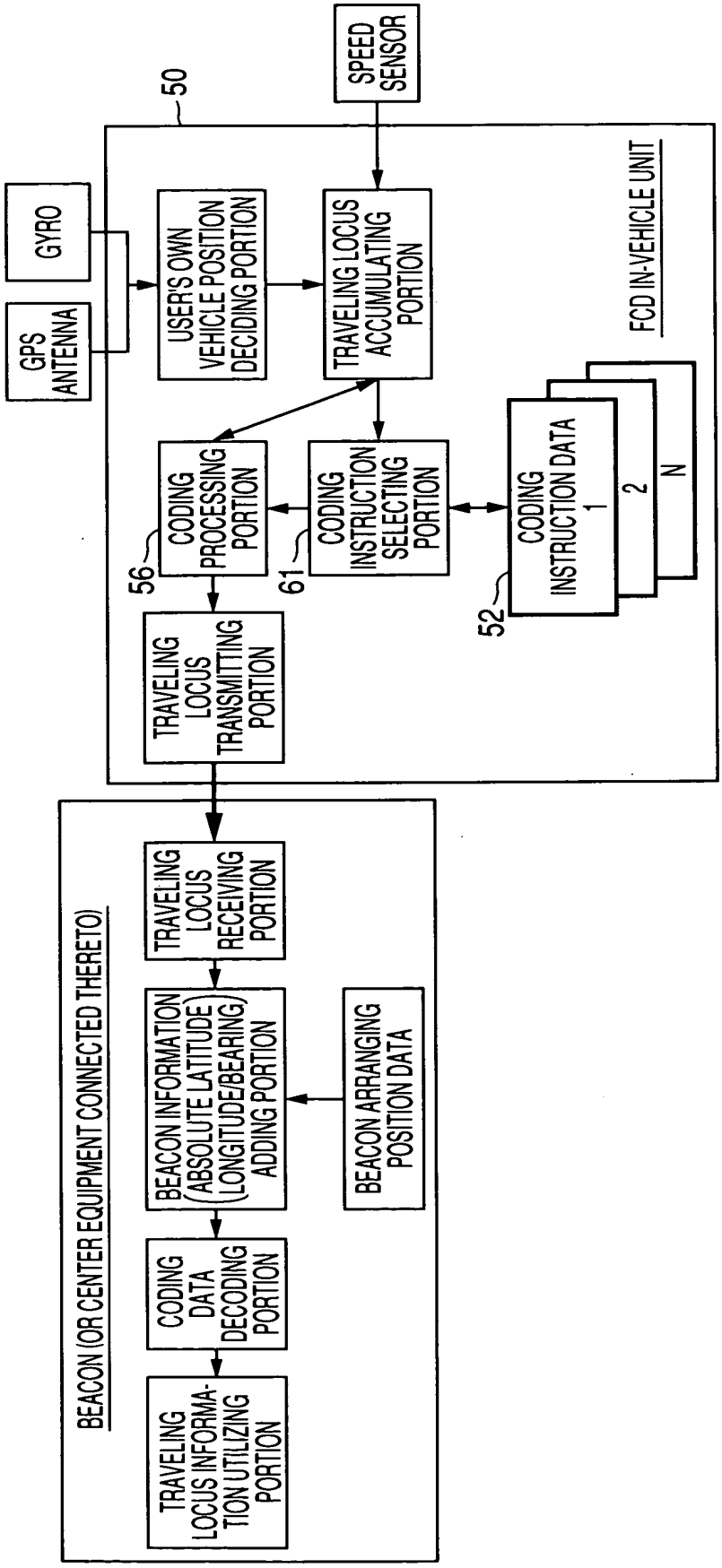

SPEED SENSOR
50
GYRO
GPS ANTENNA
USER'S OWN VEHICLE POSITION DECIDING PORTION
TRAVELING LOCUS ACCUMULATING PORTION
FCD IN-VEHICLE UNIT
CODING PROCESSING PORTION
56
CODING INSTRUCTION SELECTING PORTION
61
CODING INSTRUCTION DATA 1
2
N
52
TRAVELING LOCUS TRANSMITTING PORTION
BEACON (OR CENTER EQUIPMENT CONNECTED THERETO)
TRAVELING LOCUS RECEIVING PORTION
BEACON INFORMATION (ABSOLUTE LATITUDE/LONGITUDE/BEARING) ADDING PORTION
BEACON ARRANGING POSITION DATA
CODING DATA DECODING PORTION
TRAVELING LOCUS INFORMATION UTILIZING PORTION

FIG. 15

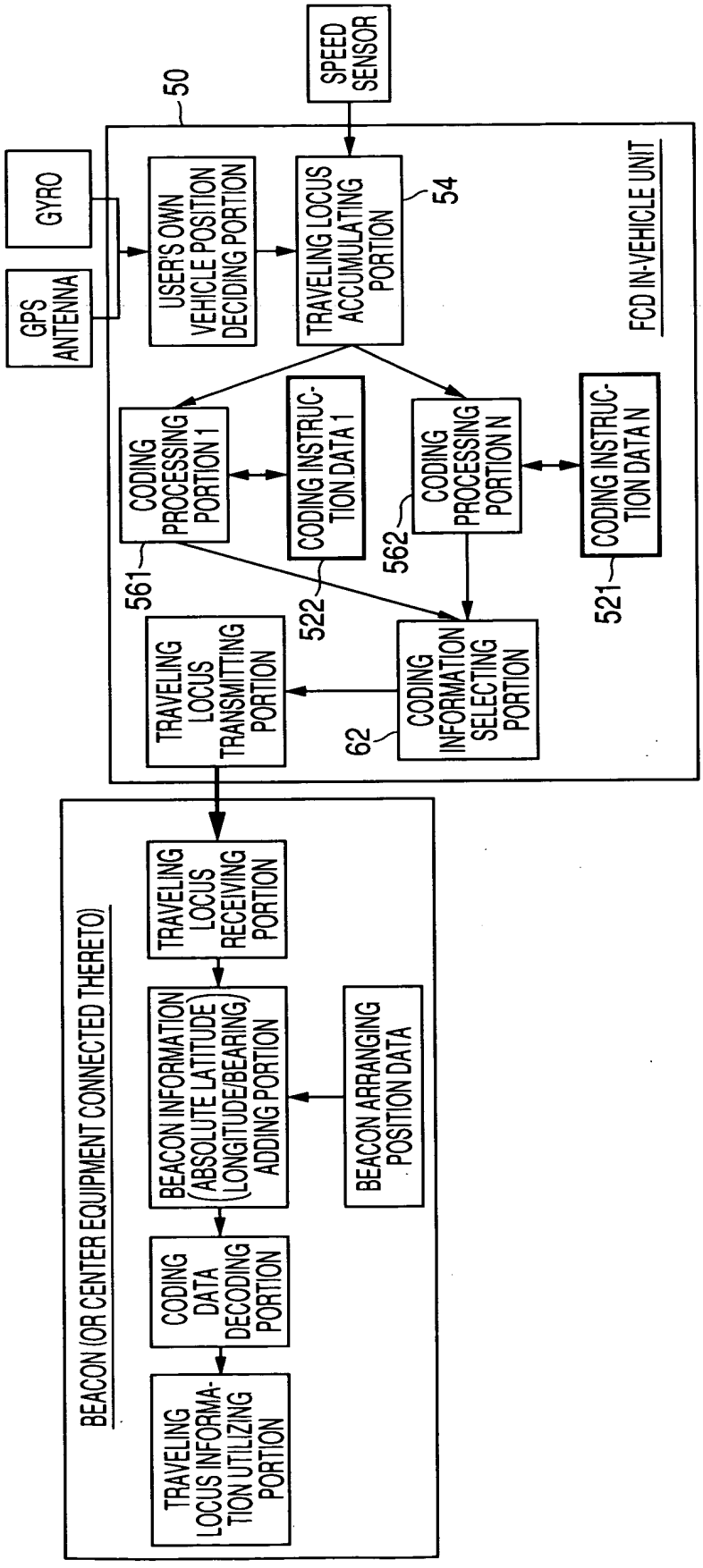

SPEED SENSOR
50
GYRO
GPS ANTENNA
USER'S OWN VEHICLE POSITION DECIDING PORTION
TRAVELING LOCUS ACCUMULATING PORTION
54
FCD IN-VEHICLE UNIT
CODING PROCESSING PORTION 1
CODING INSTRUC-TION DATA 1
CODING PROCESSING PORTION N
CODING INSTRUC-TION DATA N
561
562
522
521
TRAVELING LOCUS TRANSMITTING PORTION
CODING INFORMATION SELECTING PORTION
62
BEACON (OR CENTER EQUIPMENT CONNECTED THERETO)
TRAVELING LOCUS RECEIVING PORTION
BEACON INFORMATION (ABSOLUTE LATITUDE/LONGITUDE/BEARING) ADDING PORTION
BEACON ARRANGING POSITION DATA
CODING DATA DECODING PORTION
TRAVELING LOCUS INFORMA-TION UTILIZING PORTION

FIG. 16

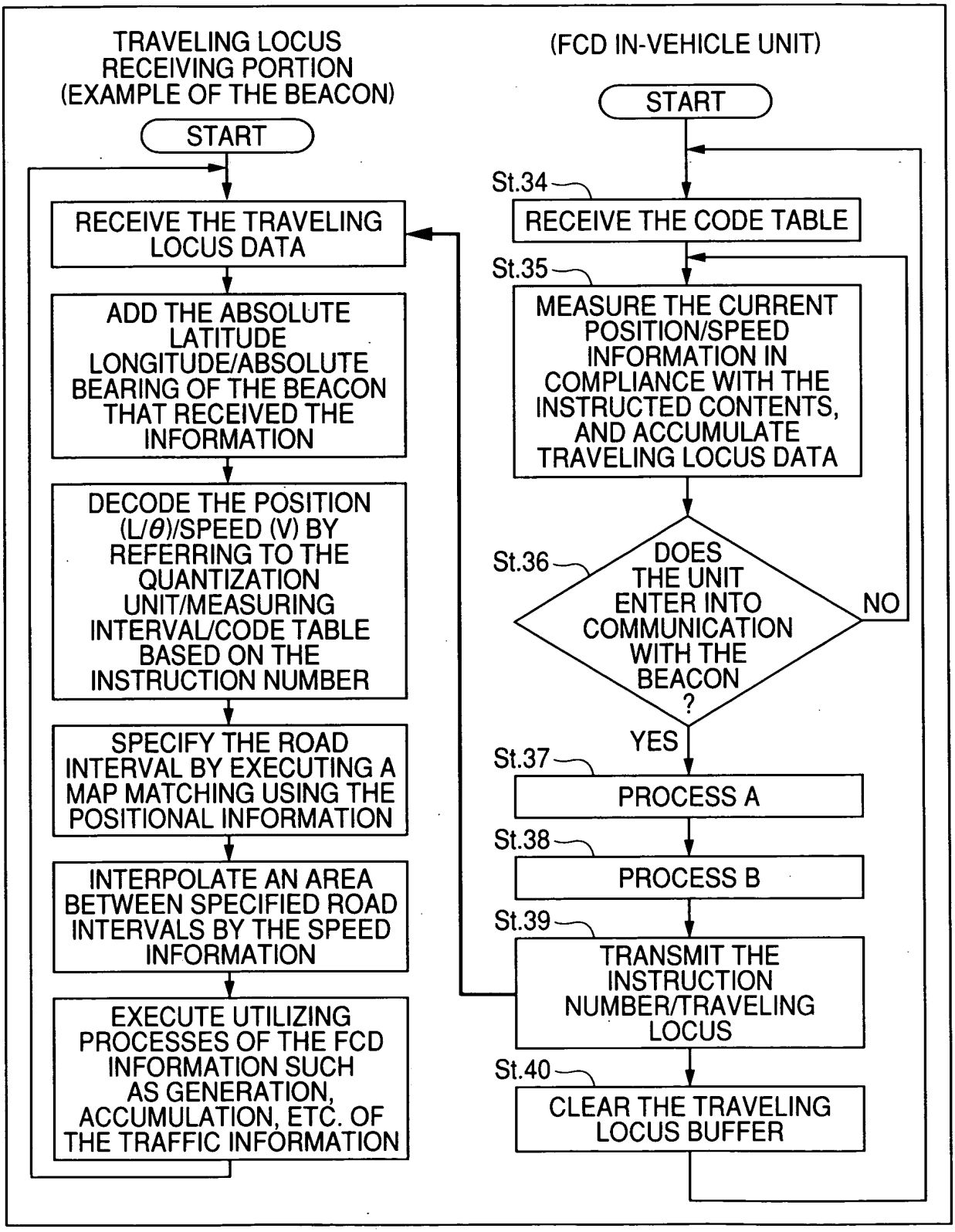

TRAVELING LOCUS RECEIVING PORTION (EXAMPLE OF THE BEACON)
START
RECEIVE THE TRAVELING LOCUS DATA
ADD THE ABSOLUTE LATITUDE LONGITUDE/ABSOLUTE BEARING OF THE BEACON THAT RECEIVED THE INFORMATION
DECODE THE POSITION (L/θ)/SPEED (V) BY REFERRING TO THE QUANTIZATION UNIT/MEASURING INTERVAL/CODE TABLE BASED ON THE INSTRUCTION NUMBER
SPECIFY THE ROAD INTERVAL BY EXECUTING A MAP MATCHING USING THE POSITIONAL INFORMATION
INTERPOLATE AN AREA BETWEEN SPECIFIED ROAD INTERVALS BY THE SPEED INFORMATION
EXECUTE UTILIZING PROCESSES OF THE FCD INFORMATION SUCH AS GENERATION, ACCUMULATION, ETC. OF THE TRAFFIC INFORMATION
(FCD IN-VEHICLE UNIT)
START
St.34
RECEIVE THE CODE TABLE
St.35
MEASURE THE CURRENT POSITION/SPEED INFORMATION IN COMPLIANCE WITH THE INSTRUCTED CONTENTS, AND ACCUMULATE TRAVELING LOCUS DATA
St.36
DOES THE UNIT ENTER INTO COMMUNICATION WITH THE BEACON ?
NO
YES
St.37
PROCESS A
St.38
PROCESS B
St.39
TRANSMIT THE INSTRUCTION NUMBER/TRAVELING LOCUS
St.40
CLEAR THE TRAVELING LOCUS BUFFER

FIG. 17

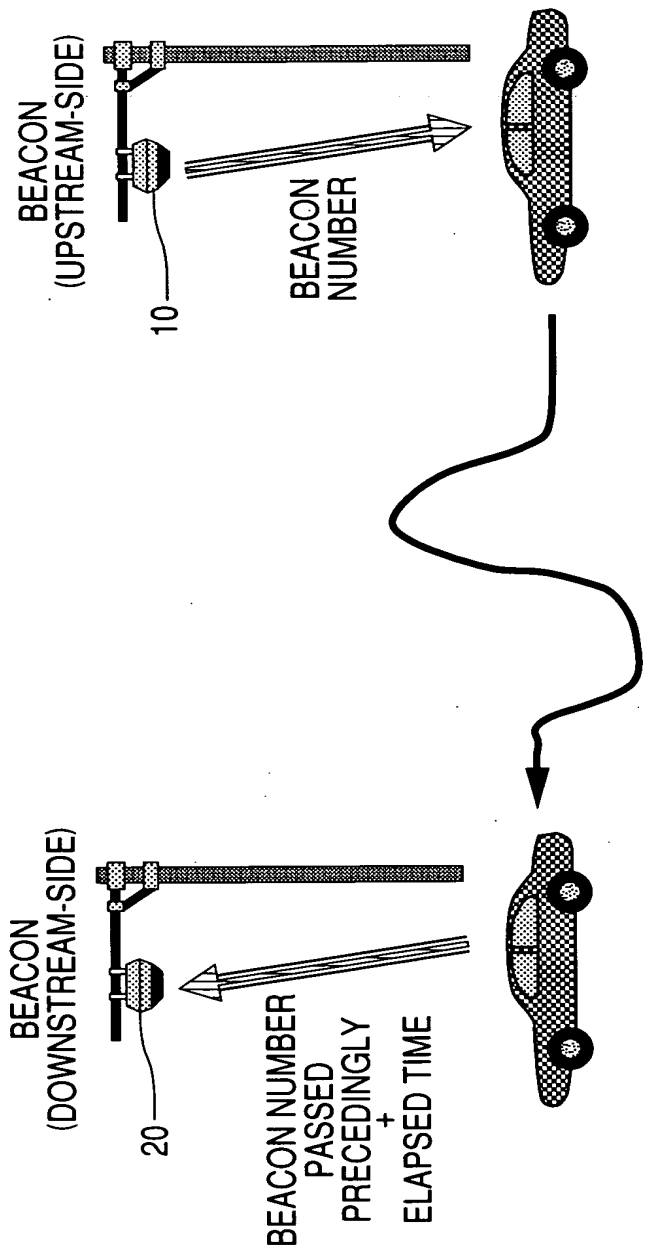
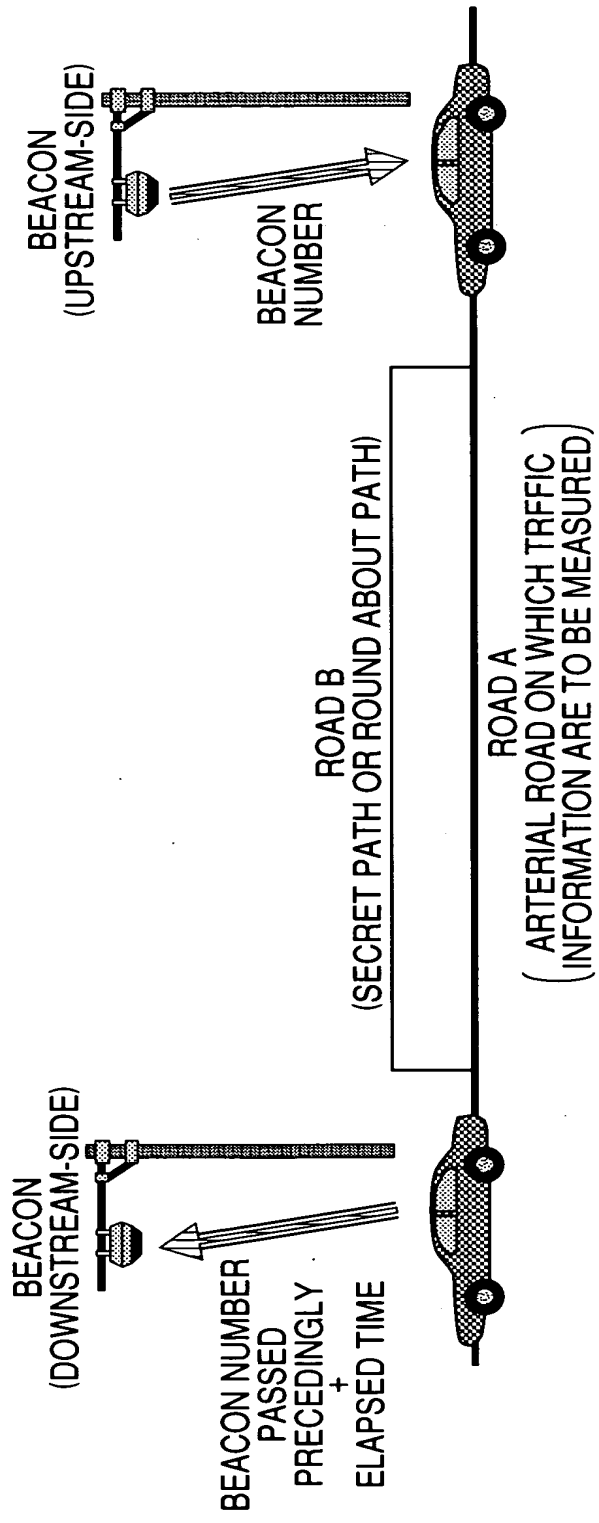

BEACON
(UPSTREAM-SIDE)
10
BEACON
NUMBER
BEACON
(DOWNSTREAM-SIDE)
20
BEACON NUMBER
PASSED
PRECEDINGLY
+
ELAPSED TIME

FIG. 18


BEACON
(UPSTREAM-SIDE)
BEACON
NUMBER
ROAD B
(SECRET PATH OR ROUND ABOUT PATH)
ROAD A
(ARTERIAL ROAD ON WHICH TRFFIC
INFORMATION ARE TO BE MEASURED)
BEACON
(DOWNSTREAM-SIDE)
BEACON NUMBER
PASSED
PRECEDINGLY
+
ELAPSED TIME